

CLAIMS

1. A materials analysis system for testing a test material, including:
an oven, including:
a housing comprising at least one of a ceramic or a ceramic fiber; and
a heating element in communication with the housing and configured to transfer heat to an interior of the housing;
a control system configured to control the heating element; and
a mass measuring system connected to the control system and having a test material support associated with the oven housing.
2. A materials analysis system according to claim 1, wherein the control system is configured to control the heating element according to a first criterion when the interior of the housing is at a first temperature and according to a second criterion when the interior of the housing is at a second temperature.
3. A materials analysis system according to claim 2, wherein the control system is configured to control the heating element according to a feedback process, wherein the first criterion is a first constant used in the feedback process and the second criterion is a second constant used in the feedback process.
4. A materials analysis system according to claim 3, wherein the feedback process includes a PID algorithm.
5. A materials analysis system according to claim 1, wherein the control system is configured to control the heating element according to:
a weight change rate for the test material based on a signal from the mass measuring system; and

- a predetermined ashing rate.
6. A materials analysis system according to claim 1, wherein the control system is configured to consecutively perform a loss-on-drying process to the test material and an ashing test to the test material.
 7. A materials analysis system according to claim 1, wherein the control system is configured to control the heating element using a modulated signal having a variable period.
 8. A materials analysis system according to claim 1, wherein the control system is configured to execute a self-cleaning process.
 9. A materials analysis system according to claim 1, wherein the heating element comprises a radiative heating element.
 10. A materials analysis system according to claim 1, wherein the test material support includes at least four prongs.
 11. A materials analysis system for analyzing a test material, comprising:
an oven, including:
a housing including a ceramic; and
a radiative heating element;
a control system connected to the heating element and configured to control the heating element to execute at least one of a loss-on-drying process and an ashing process on the test material.
 12. A materials analysis system according to claim 11, further comprising a mass measuring system connected to the control system and configured to weigh the test material in the oven.

13. A materials analysis system according to claim 11, further comprising a temperature sensor at least partially disposed within the oven housing and connected to the control system.
14. A materials analysis system according to claim 11, wherein the control system:
 - includes a memory configured to store multiple sets of constants, and
 - is configured to control the heating element according to different sets of constants retrieved from the memory when the interior of the housing is at different temperatures.
15. A materials analysis system according to claim 14, wherein the control system is configured to control the heating element according to a feedback process, wherein the different sets of constants are used in the feedback process.
16. A materials analysis system according to claim 15, wherein the feedback process includes a PID algorithm.
17. A materials analysis system according to claim 11, wherein the control system is configured to control the heating element to execute the ashing process according to:
 - to:
 - a weight change rate for the test material calculated by the control system based on a weight signal from the mass measuring system; and
 - a predetermined ashing rate associated with the test material.
18. A materials analysis system according to claim 11, wherein the control system is configured to consecutively perform the loss-on-drying process to the test material and the ashing test to the test material.

19. A materials analysis system according to claim 11, wherein the control system is configured to control the heating element using a frequency modulated signal.
20. A materials analysis system according to claim 11, wherein the control system is configured to control the heating element according to a target activation value and an actual activation value.
21. A materials analysis system according to claim 11, wherein the control system is configured to execute a self-cleaning process.
22. A materials analysis system according to claim 11, wherein the test material support includes at least four prongs.
23. A method of testing a test material, comprising:
 - determining an initial weight of the test material;
 - exposing the test material to a temperature in excess of 300°C in an oven;
 - measuring a change of the temperature in the oven;
 - measuring a change of weight of the test material; and
 - controlling a heating element for the oven according to at least one of the change of temperature in the oven and the change of weight of the test material.
24. A method of testing a test material according to claim 23, wherein controlling the heating element includes frequency modulating a power provided to the heating element.
25. A method of testing a test material according to claim 23, wherein controlling the heating element includes controlling the heating element in conjunction with a PID algorithm.

26. A method of testing a test material according to claim 25, wherein controlling the heating element includes:
- using a first set of constants in the PID algorithm when the temperature in the oven is within a first range; and
 - using a second set of constants in the PID algorithm when the temperature in the oven is within a second range.
27. A method of testing a test material according to claim 23, wherein controlling the heating element includes controlling the heating element in conjunction with a preselected ash rate for the test material.
28. A method of testing a test material according to claim 23, wherein controlling the heating element includes:
- determining a target activation value for the heating element;
 - determining an actual activation value for the heating element; and
 - deactivating the heating element according to a relationship between the target activation value and the actual activation value.